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Total No. of Questions : 24

B.Pharma (2012 to 2016) (Sem.–3)

PHARMACEUTICAL MATHEMATICS

Subject Code : BPHM-301

M.Code : 46221

Time : 3 Hrs. Max. Marks : 80

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of FIFTEEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.**
3. **SECTION-C contains FOUR questions carrying TEN marks each and students have to attempt ANY THREE questions.**

SECTION-A

Solve the following :

1. Define singular matrix and show that $A = \begin{bmatrix} 1 & 4 & 3 \\ 6 & 8 & 5 \\ 2 & 8 & 6 \end{bmatrix}$ is singular matrix.

2. Without expanding show that the value of determinant is zero $\begin{vmatrix} 1 & 3 & 5 \\ 2 & 6 & 10 \\ 31 & 11 & 38 \end{vmatrix}$.

3. Find X and Y if $X + Y = \begin{bmatrix} 7 & 0 \\ 2 & 5 \end{bmatrix}$ and $X - Y = \begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$.

4. Find the length of an arc of a circle of radius 5 cm subtending a central angle measuring 15°.

5. Prove $\frac{\sin A + \sin 3A}{\cos A + \cos 3A} = \tan 2A$.

6. Find the differential coefficient of $6x + 1$ *w.r.t* x by using first Principle.

7. Differentiate the function $(x + a)^m (x + b)^n$.

8. Integrate the function $\frac{x^2 + 3x + 4}{\sqrt{x}}$.

9. Evaluate $\int \frac{dx}{\sqrt{x}\,(1+\sqrt{x})}$.

10. The mean of 100 students were found to be 40. Later on it was discovered that a score of 53 was misread as 83. Find the correct mean.

11. For a set of 10 observations, mean = 5, S.D = –2 and C.V = 60%. Comment.

12. Is there any fallacy in the statement? The mean of a Binomial Distribution is 20 and its standard deviation is 7.

13. Write relation between mean, median and mode.

14. Calculate the standard deviation of first 7 natural numbers.

15. During war 1 ship out of 9 was sunk on an average in making a certain voyage. What was the probability that exactly 3 out of a convoy of 6 ships would arrive safely?

SECTION-B

16. If $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 6 \\ 3 & 4 \end{bmatrix}$, $C = \begin{bmatrix} 4 & 6 \\ 3 & 5 \end{bmatrix}$ verify (AB)C = A(BC).

17. Prove $\tan 11\frac{1^o}{4} = \sqrt{2} + 1$.

18. Calculate the mean and standard deviation for the following distribution :

Marks :	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No of students :	3	6	13	15	14	5	4

19. Find $\frac{dy}{dx}$ for the function in parametric form $x = \frac{3at}{1+t^3}$, $y = \frac{3at^2}{1+t^3}$.

20. If $y = a \cos(\log x) + b \sin(\log x)$ then show that $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$.

SECTION-C

21. Using Cramer's rule solve the following system of equations :

$x - y + 3z = 6$

$x + 3y - 3z = -4$

$5x + 3y + 3z = 10$

22. In an examination taken by 500 candidates the average and standard deviation of marks obtained (normally distributed) are 40% and 10%. Find approximate

a) How many will pass if 50% is fixed as a minimum?

b) What should be minimum if 350 candidates are to pass?

c) How many have scored above 60%?

(Given P $(0 \le Z \le 1) = 0.3415$, P $(0 \le Z \le 2) = 0.4772$, P $(0.2) = 0.53$)

23. a) Evaluate $\int e^x \sin x dx$

b) Evaluate $\int \frac{3x+1}{(x-2)^2 (x+2)} dx$

24. a) Differentiate $\log (x+\sqrt{1+x^2})$.

b) Prove that $\cos 20° \cos 40° \cos 60° \cos 80° = \frac{1}{16}$.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.